Overview of Transitioning Software to HP-UX on IA-64

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Overview of Transitioning Software to HP-UX on IA-64

Introduction to IA-64

IA-64 is Intel's next generation 64-bit architecture for microprocessors. It contains the 64-bit Instruction Set Architecture (ISA) developed jointly by Hewlett-Packard Company and Intel Corporation, as well as an IA-32 compatible component. (IA-32 is Intel's 32-bit architecture, also known as x86. IA-32 chips include the 486, Pentium®, and Pentium II®.)

The 64-bit ISA is based on the EPIC architecture technology, also jointly defined by HP and Intel. EPIC stands for Explicitly Parallel Instruction Computing.

IA-64 supports both 32-bit and 64-bit computing environments and is compatible with HP's existing PA-RISC (Precision Architecture Reduced Instruction Set Computing) architecture.

For more background information on IA-64, see *Overview of IA-64 Architecture* in the HP-UX 11.x Software Transition Kit (STK).

HP-UX on IA-64

HP-UX for IA-64 is a version of HP-UX 11.x. The same HP-UX version will run on both PA-RISC and IA-64 systems, and will be compiled from common source for compatibility. The environment (commands, utilities, user interfaces, shell scripts, and so on) will be the same on PA-RISC and IA-64 systems.

IA-64 supports both big Endian and little Endian operating systems. HP-UX has always been a big Endian operating system, and will continue to be so on IA-64. This means that HP-UX applications will be able to read their existing binary data on IA-64.

There are a few planned differences between HP-UX on PA-RISC and IA-64. In particular, HP-UX on IA-64 will have a different run-time architecture, object file format, and debug information format. The different run-time architecture is needed to support IA-64. The new object file and debug information formats will make HP-UX more similar to other UNIX operating systems. These new formats will make it easier for software development tool providers to support HP-UX, and should result in more software development tools for HP-UX. The HP-UX implementation will also have some minor changes to support IA-64. For example, the kernel data structures will need to be updated to handle all of the registers on IA-64. These changes should only affect kernel-intrusive software.

Software Compatibility

Well-behaved PA-RISC binaries that run on HP-UX 11.x will run on HP-UX on IA-64. The new IA-64 architecture was designed to enable binary compatibility with the PA-RISC architecture. Source compatibility will also be provided between HP-UX 11.x on IA-64 and HP-UX 11.x on PA-RISC.

In general, well-behaved applications are those that are not sensitive to the architecture or operating system implementation. Well-behaved applications follow these general guidelines for compatibility:

- Use only public APIs.
- Adhere to required practices that are specifically documented.
- Do not use features that are specifically described as having platform, architecture, or configuration limitations.
- Do not decompose an HP-UX product and then re-use the results of the decomposition.

These guidelines are described in more detail in *Coding Practices for Compatibility* in the STK.

Deciding Whether to Run PA-RISC or Native IA-64 Binaries

Although well-behaved PA-RISC binaries will run on IA-64, native IA-64 binaries will run faster. This is because native IA-64 binaries will be compiled to expose the parallelism in the code and will be optimized to take advantage of the architectural features and resources of IA-64.

Many applications will have acceptable performance without being recompiled for IA-64. The capability to run both existing PA-RISC and native IA-64 binaries allows HP customers and ISVs to make an incremental transition to HP-UX on IA-64, as illustrated in the following two examples.

In the first example, suppose you want to run several of your applications on an IA-64 based system. You can start by using native versions of just the architecture-sensitive applications, while running all other well-behaved applications in compatibility mode on IA-64. You can then update the latter applications to native versions over time. The primary benefit of this approach is that you need not wait until you have native versions of all your applications to make them available on IA-64. By changing one application at a time, it will also be easier to diagnose any problems that may occur during the transition. Plus, system performance will improve over time as more of your applications become native.

For the second example, suppose you have an application that is composed of many processes, and the different processes have varying levels of architecture- and performance-sensitivity. In this case, you can start by compiling native versions of just the architecture-sensitive processes of your application, while leaving the rest to run in compatibility mode. This allows you to provide the application to your customers as early as possible. You can then compile native versions of the performance-sensitive processes in order to provide a high-performance version to your customers. Eventually, you might want to compile native versions of all the processes, if an all-native version of your application would be easier for you to build and support long-term.

As you can see from these examples, you have a great deal of flexibility when transitioning your software to HP-UX on IA-64. You can either leave your well-behaved PA-RISC binaries running in compatibility mode on IA-64, or transition them into native IA-64 binaries. You also have the option of transitioning processes incrementally within an application to native IA-64. This inherent flexibility allows you to get up and running on IA-64 much faster on HP-UX than with other enterprise UNIX operating systems.

Learning About Software Transitions to HP-UX on IA-64

The following two subsections explain how you can learn about transitioning your software to HP-UX on IA-64 by using the information in the HP-UX 11.x Software Transition Kit (`http://www.software.hp.com/`) and by joining HP's Designing the Future program (`http://dtf.hp.com/dtf/`).

HP-UX 11.x Software Transition Kit

The HP-UX 11.x Software Transition Kit is the foundation for HP's IA-64 software transition tools and processes. You can use the STK now to prepare most of your existing PA-RISC binaries and source code for HP-UX on IA-64. HP will add more information to the STK about transitioning software to IA-64 as that information becomes available.

As explained earlier, well-behaved PA-RISC binaries that run on HP-UX 11.x will also run on HP-UX on IA-64. To make your well-behaved PA-RISC binaries ready for IA-64, you can test them on HP-UX 11.x on PA-RISC with the *qualification process* described in *Qualifying Software for HP-UX 11.x* in the STK.

In addition, you can pre-enable most of your existing source code for IA-64 on HP-UX 11.x on PA-RISC, since HP-UX on IA-64 will also be source-compatible with HP-UX 11.x. To do this, see *Preparing Source Code for HP-UX on IA-64* in the STK.

HP's Designing the Future Program

HP's Designing the Future (DTF) program is a comprehensive program of events, tools, and services for software developers who are transitioning to HP's IA-64 based systems. The DTF program also provides tools and services to facilitate continuous collaboration between the software developer community and HP.

By becoming a member of the DTF program, you will receive exclusive access to technical support and information, including:

- **The *Designing the Future* newsletter**, keeping you up-to-date on the latest information and tools
- **Participation in DTF symposiums**, providing a forum that allows interaction among HP, tool partners, and other developers in an informal setting
- **Online presentations from past DTF symposiums**, providing easy access to symposium information
- **CDs** containing IA-64 and software development information and tools

The Designing the Future program maintains a web site at: `http://dtf.hp.com/dtf/.` On this web site, you can find IA-64 software development news and information. DTF program membership is free, and by registering at the web site, you can obtain access to all DTF membership benefits.